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HANAULUX® 2000
Operating instructions

for all HANAULUX 2000 ceiling- and wall modells

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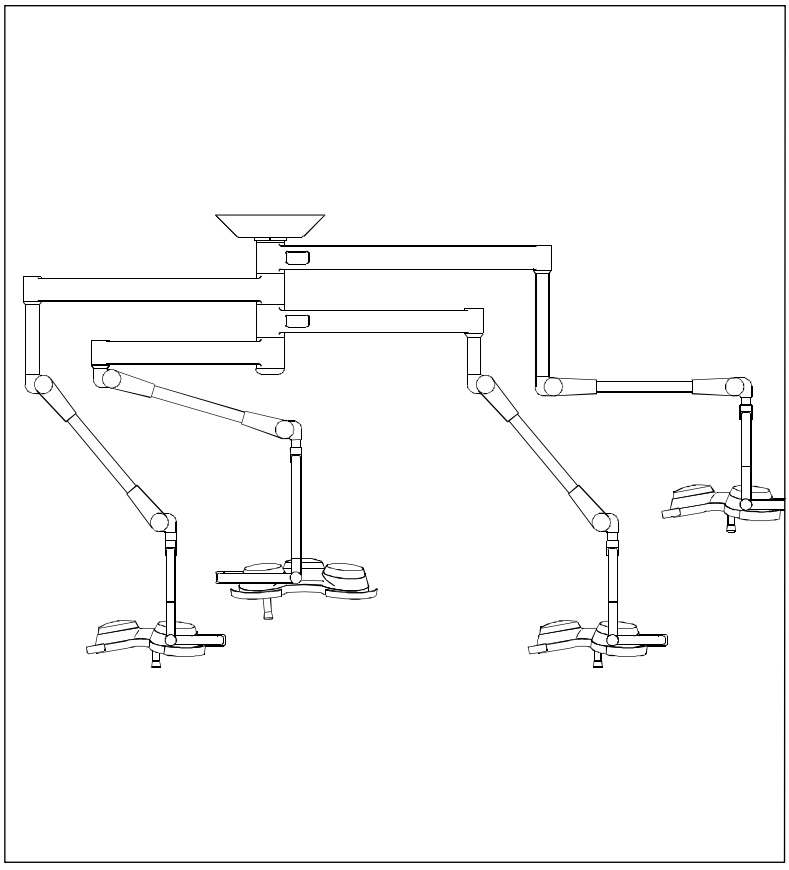

	TABLE OF CONTENTS	PAGE
1.0	**Important safety information**	1
2.0	**Description of the HANAULUX 2000 system**	5
	2.1 The HANAULUX concept	5
	2.2 Standard components	5
	2.3 Special components	6
	2.4 Expandability	7
3.0	**The HANAULUX benefits**	8
	3.1 Briliant cool light	8
	3.2 In-depth illumination	9
	3.3 Optimal hygiene	9
	3.4 Easy manoeuvrability, true positioning	9
4.0	**Operating your HANAULUX 2000 system**	10
	4.1 Mounting the sterilisable handle	10
	4.2 Positioning the lights	11
	4.3 Focussing the lights and changing the fieldsize	12
	4.4 Dimming the light	13
	4.5 Operating the HANAULUX 2007 iXL AF/2007 iXL D	14
5.0	**Important information about halogen bulbs**	15
	5.1 Changing the bulb	16
6.0	**Adjustments**	17
	6.1 Adjusting the brakes	17
	6.2 Adjusting the spring-arms	18
7.0	**Cleaning/desinfecting and sterilising**	19
	7.1 Cleaning/ desinfecting the light	19
	7.2 Cleaning the lenses	19
	7.3 Sterilising the handles	19
	7.4 Cleaning HANAUVISION	19
8.0	**Maintenance and Repair**	20
9.0	**Troubleshooting your HANAULUX 2000 system**	21
10.0	**Technical Data**	23

1.0 Important safety information

Dear User!

- **These instructions are intended for medical and technical staff in hospitals and general practice.**
- **The work in the section entitled ”Maintenance” can be carried out by the operator’s service man with due consideration for the safety notes.**
- **The unit can be cleaned by trained cleaning staff.**
- **Please read these instructions carefully before using the unit. This will allow you to obtain the full benefit from the unit and will protect you and others from any injury.**

Dear Operator!

These instructions apply to all HANAULUX 2000 ceiling and wall models.

- Your HANAULUX 2000 operating theatre lighting system was developed with consideration for the high demands made on the surgeon’s eyes during surgery. Modern technology and the HANAUCHROME optical system optimise the illumination and detail recognition in the operating field.With the HANAULUX 2000 operating theatre lighting system you have a unit which together with the HANAUCHROME optical system brings brilliant light into the operating field. More light with greater colour reproduction and a lower heat load penetrates deep into the wound.This unit has been designed using the latest technology and is fail-safe. Nevertheless there are risks in using this unit, especially when it is operated by staff who are not adequately trained or when it is used incorrectly or not as intended.
- Using these instructions show cleaning staff how to clean and care for the unit.
- Where there are translations in foreign languages the German version of these instructions is binding.
- Unauthorised modifications or alterations to the unit are not permitted for safety reasons.
- In the event of particular problems which are not covered in sufficient detail in these instructions please contact your supplier for your own safety.

Keep these instructions in a safe place close to the unit so that they can be consulted for safety notes and important information.

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The Operating Instructions are designed to be as clear as possible. The illustrations are all numbered to correspond to the relevant text. This helps you follow the instructions in the text more easily.

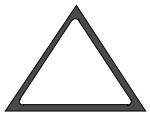
These operating instructions refer to the following HANAULUX 2000 luminaire systems, as a single light or in combination with other HANAULUX 2000 lights or accessories:

- HANAULUX 2007 iXL/2007 iXL D/2007 iXL AF
- HANAULUX 2005 i und 2005 iXL
- HANAULUX 2004 i und 2004 iXL
- HANAULUX 2003 i und 2003 iXL
- HANAULUX 2002 i.

Explanation of the symbols used in these operating instructions:

1. COMMENT! is used where the correct functioning of the appliance could be affected.

COMMENT!



2. ATTENTION! is used where the appliance could be damaged.

ATTENTION!

3. DANGER! is used where someone could be injured or killed.

DANGER!

1.1 General Safety Notes

To aid the surgeon where vision is difficult the light units offer a high degree of illumination. The laws of physics mean that even visible light produces heat in the operating field. If light fields from several light units are superimposed on each other, illumination over 1000 W/m2 can be obtained. This involves an increased risk of the tissue drying out and, especially in the case of longer use and reduced blood flow, there is also the possibility of tissue damage.

DANGER!

A red band is located under the retaining ring on the light unit side of the spring arm. This band should not be visible during normal operation.If the band is visible inform an authorised service man immediately as there is a risk that the light unit could fall.

1.1.1 Use as intended

- The HANAULUX® 2000 is for illuminating an examination or operation area of a patient in the clinic or doctor's surgery.
- A single HANAULUX® 2000 lamp is only suitable for operations in which the light going out does not endanger the patient.
- A HANAULUX 2000 operation luminaire system with several lamps is suitable without limitation.
- The optimum working distance is 70 to 140 cm.
- The HANAULUX® 2000 operation luminaire system is suitable for continuous operation.
- Additional load on the light suspension is not permitted.
- The light system is not for operation in areas where there is danger of explosion
- The light system is not suitable for use in combustible mixtures of anaesthetics with air or oxygen or nitrous oxide.
- Keep the ambient temperature from 10°C to 40°C during operation.
- The relative humidity must not exceed 75%.

1.2.2 Requirements for safe operation

The safe and correct function of the luminaire system HANAULU 2000 within the given technical data is only guaranteed if the following conditions are fullfilled:

- The ceiling anchorage must be statically safesecure and there must be a statics certificate.
- The electrical installations of the rooms concerned must conform to the nationally valid specifications. VDE 0107 applies for Germany.
- Extensions, alterations or repairs must be carried out by Heraeus Med or an authorized specialist.
- The HANAULUX® 2000 light system must be assembled as in the assembly instructions accompanying the components.
- For service, repairs and alterations and as accessories, only original Heraeus MED parts may be used.

1.2.3 Transport and Storage

The following storage conditions apply for up to 15 weeks:

- Temperature- 25....+70°C
- Relative humidity 10%....75%
- Air pressure 500hPa....1060hPa

after which the values for the operating conditions apply

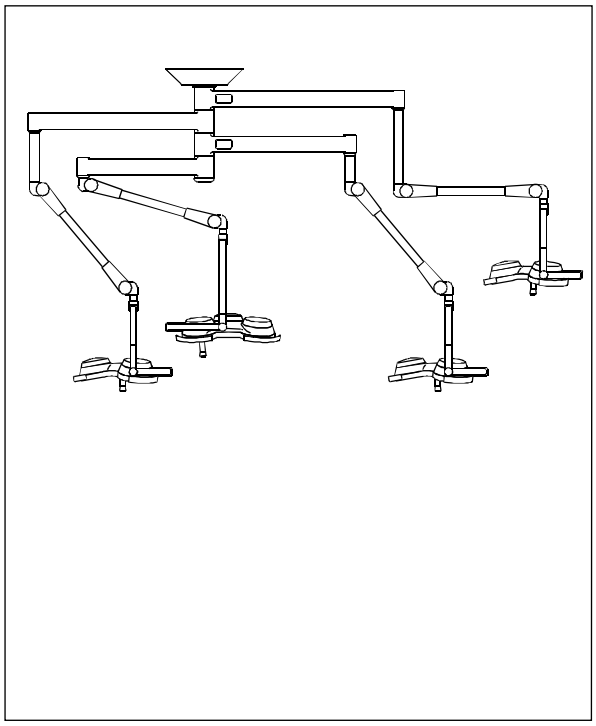
- Do not subject the apparatus to severe shaking

1.2.4 Disposal

Old units contain materials which are still valuable. Do not take old units to the nearest tip but find out about possible local recycling from the town/ local authority.

HANAULUX halogen lamps can be disposed of as domestic waste.

2.1 The HANAULUX 2000 concept



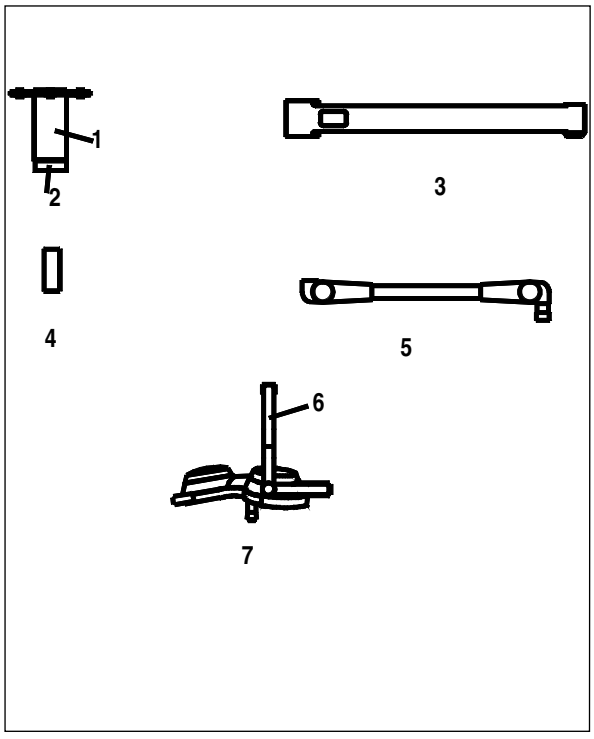
The HANAULUX 2000 system is a modern operating theatre lighting concept which fulfils the highest requirements for light quality, hygiene and flexibility. The basic principle of the HANAULUX 2000 lighting systems is the compatibility and interchangeability of the individual components. The modular construction concept allows configuration of the systems to suit any surgical discipline.

The version "main light with SATELLIT" refers to a combination with two or more different lightheads.The lighthead with the highest light-intensity is called the main light and is always mounted on the lowest position, or "position 1", of the central axle.

Fig. 2-1 shows a HANAULUX 2000 luminaire system with the following components:

- 2005 main light, position 1
- 2003 SATELLIT light, position 2/3/4

2.2 Standard components



The standard HANAULUX 2000 components are as follows:.

1	Flange tube
2.	Central axle (in flange tube)
3.	Extension-arm
4.	Spacer
5.	Spring-arm
6.	Comfort arm
7.	Lighthead with half semi-circular bracket

2.3 Special components

2.3.1. Special suspension system for low ceilings

The full benefits of the HANAULUX 2000 system can still be enjoyed even if the ceiling in your operating theatre is very low. Two special products are offered for low ceilings:
(i) A Flange-axle **1** which allows the central axle to be mounted directly to the ceiling without the need for a flange tube.
(ii) Straight spring-arms **2** with a restricted upward movement offer optimal manoeuvrability even in very low rooms.

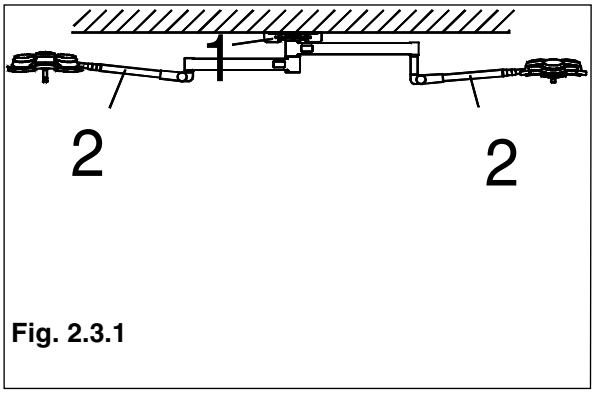


Fig. 2.3.1

2.3.2. HANAUPORT-Lite equipment carrier

An appliance console which can support medical appliances can be combined with HANAULUX 2000 light system. This console is suspended from a HANAUPORT-Lite Arm and can bear weights of 7-14 kg

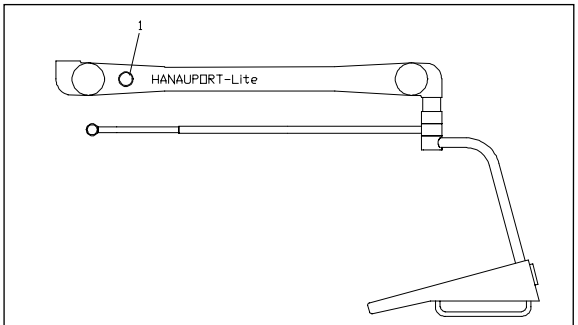


Fig. 2.3.2

2.3.4 HANAUVISION camera system

The HANAUVISION camera system combines all the advantages of the latest in camera technology with the ease of manouevrability of the HANAULUX 2000 suspension system.

A separate Installation and Operating Instruction is available for the HANAUVISION system.

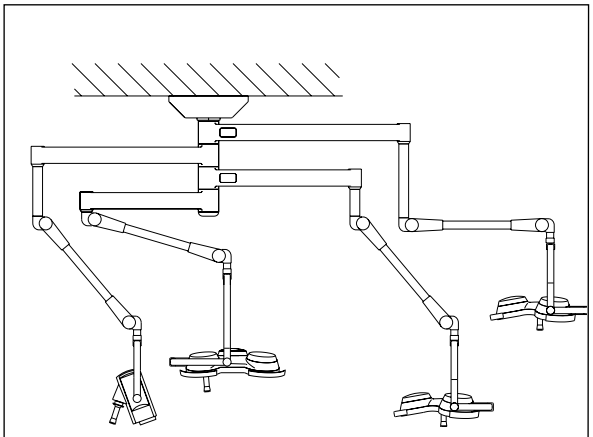


Fig. 2.3.3

2.3.5 Versions with limited rotation

The versions with camera (without WDV models), have additional cables inside the arms and central axle. The rotation in these joints is however limited in order to protect the additional cables. The rotation in the central axle is limited to 330°, the arms are limited to 360° or 225°. For exact details please see the data sheet for the product.

It is always possible to limit the rotation in the axle or the arms in a HANAULUX 2000 system should this be required. Please contact your Heraeus Med service agent for further information.

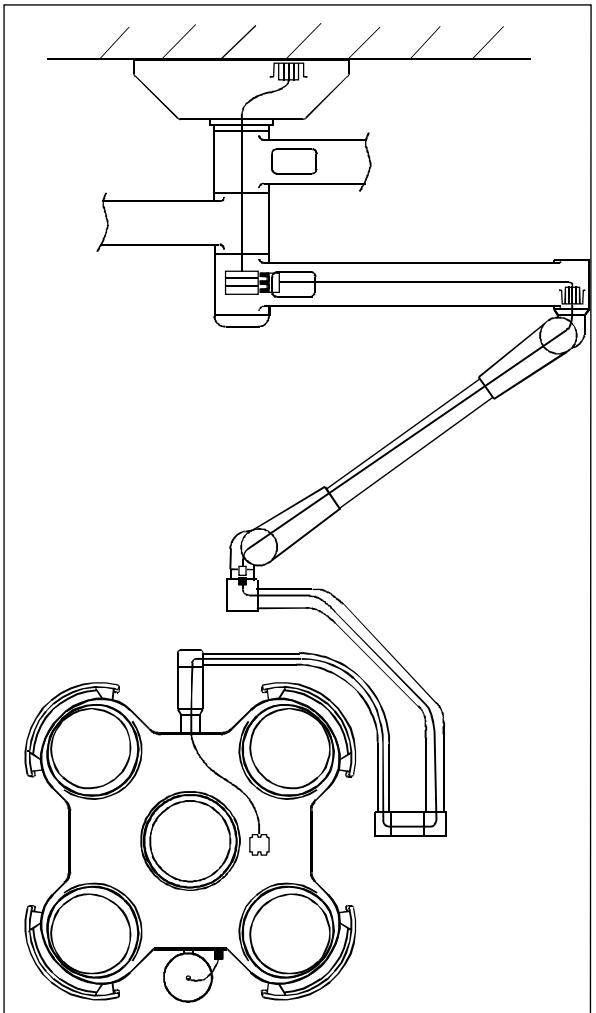


Fig. 2.3.4

2.4 Expandability

The HANAULUX 2000 luminaire system can also be prepared for the later installation of a SATELLIT light, or a HANAUVISION camera system. In this case, one axle position is left "free" and is covered with a sleeve until the SATELLIT light or camera is to be installed.

3.0 The HANAULUX Benefits

3.1 Brilliant cool light

The heart of the HANAULUX 2000 lighting system is the HANAUCHROME optical system. Each HANAULUX 2000 lightheads has a different number of HANAUCHROME optical systems, from one in the HANAULUX 2001 up to five units in the HANAULUX 2005.

Each individual HANAUCHROME system consists of a number of specially designed components, all optimised to ensure maximum illumination of the operating field.
A special halogen bulb **3,** with a unique filament geometry generates the high light-intensity.

A revolutionary glass reflector **2,** coated with a colour correcting conversion film, and an infrared reflection disc **4** remove the heat from the light, producing the famous HANAULUX cool light.

A specially developed double Fresnel lens **1**, creates a homogenous lightfield and completes the HANAUCHROME optical system which guarantees a cool "white" light for every surgical discipline.

The HANAUCHROME socket **5**, completes the system. This socket is constructed to be extra safe and ensure that changing an HANAUCHROME bulb is never dangerous. reflection disc **4** remove the heat from the light, producing the famous HANAULUX cool light.

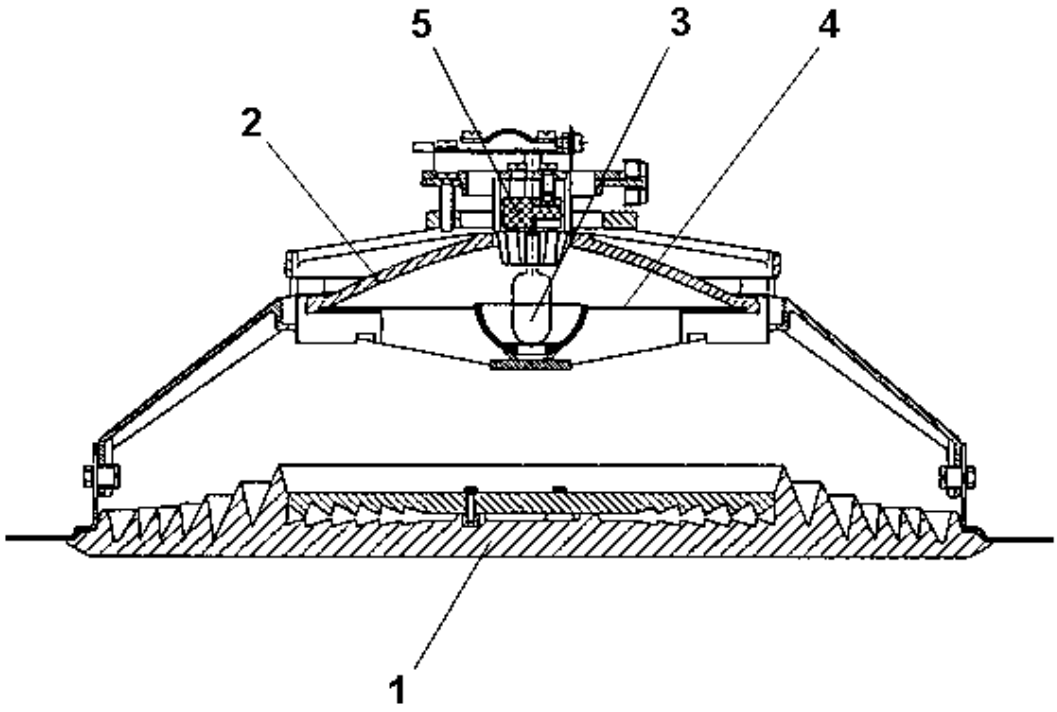


Abb. 3.1

3.2 In-Depth illumination

The double Fresnel lens produces a cascade of focal points underneath the HANAUCHROME system. The result is a well illuminated field with homogeneous light distribution and great operating depth (50 cm), almost cylindrical in shape.

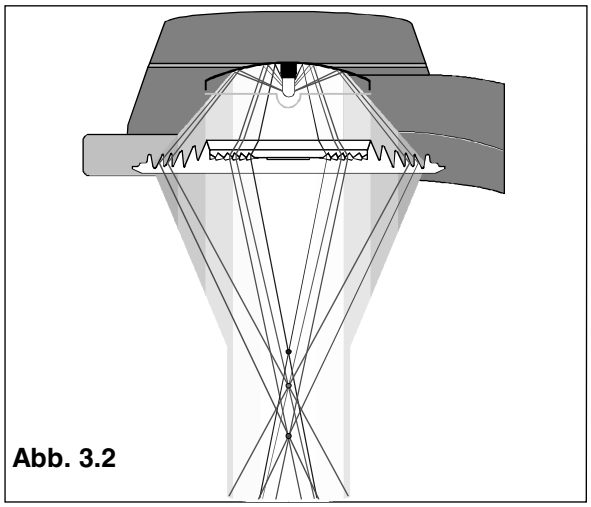


Abb. 3.2

3.3 Optimal hygiene

Every light unit in the HANAULUX 2000 luminaire system has a sealed housing with smooth surfaces. Chrome plated outer handles **1** and a removable,sterilisable central handle **2** are mounted on this housing for moving the light. All handles are robust and chemically resistant and are designed to withstand aggressive disinfecting agents.

The high glance powder coat paint system has a low surface energy. This means that it does not easily attract dirt or germs and is easy to clean. This tough paint system is also particularly resistant to scratches and scuffs.

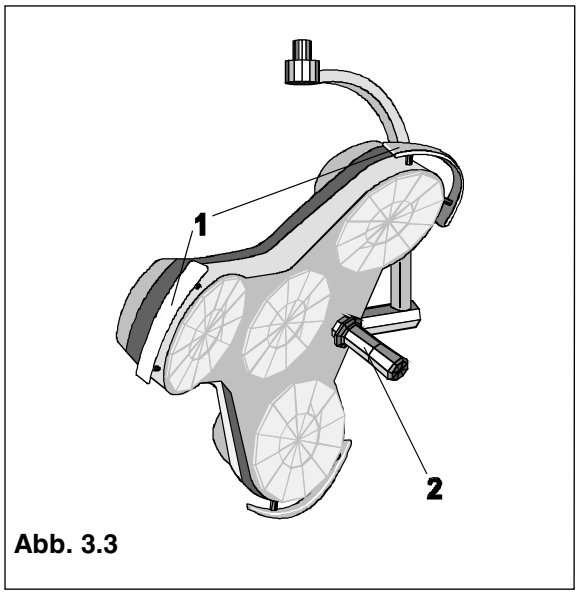


Abb. 3.3

3.4 Easy manoeuvrability, true positioning

Even if the HANAULUX 2000 system is equipped with several SATELLIT lights and a HANAUPORT Lite arm, all can be easily moved without damage or interference. Three special features make this possible: graduated extension arm lengths, graduated spacers and limitless rotation of the main joints.
The weight of the lightheads is exactly compensated by spring balances in the spring-arms which also hold every position. The finely adjustable brakes in the joints of the supporting arms ensure light, easy movement and true positioning.

1. 1200 mm extension-arm with spacer 4
2. 1050 mm extension-arm with spacer 3
3. 900 mm extension-arm with spacer 2
4. 750 mm extension-arm
5. 900 mm extension-arm for 2006 iXL TV / 2007iXL lights

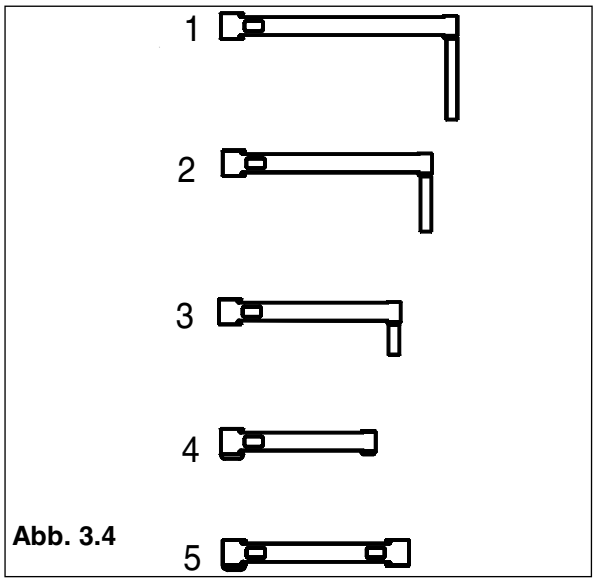


Abb. 3.4

4.0 Operating your HANAULUX 2000 luminaire system

4.1 Mounting and removing the sterilisable handle

All HANAULUX 2000 models have a sterilisable handle which can be removed and sterilised.

To mount the handle **1**, push it up onto the handle pillar until the ball bearing **2** snaps into place, as shown. The ball bearing must make an audible click.

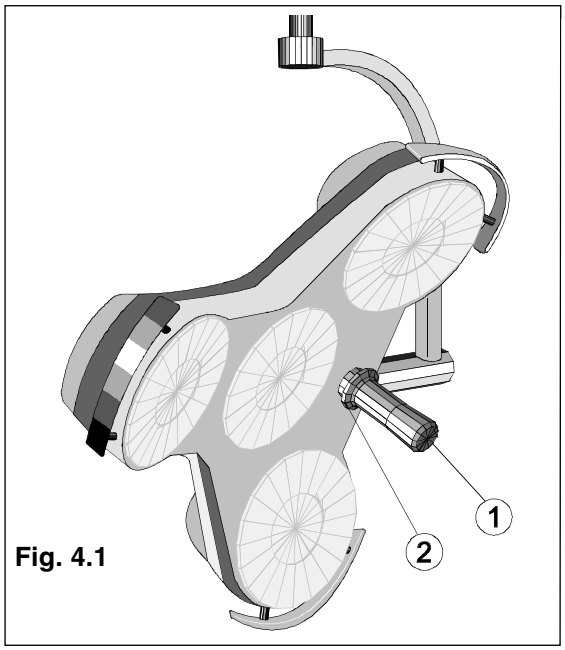


Fig. 4.1

ATTENTION!	Handles which are cracked or damaged must be replaced immediately. Otherwise they could fall down into the operating area during an operation.

To remove the handle, push in the ball bearing **2** and gently pull handle off pillar.

4.2 HANAUPORT Lite with Equipment Carrier

The weight of the appliance is balanced by weights in the shelf. These are installed during assembly of the appliance pendant. When changing the appliance for another one which weighs more or less than the previous appliance, the weights in the shelf must be changed. For further details please refer to the assembly instructions. The spring arm can be locked in the uppermost, lowermost and mid position by pressing the lock button 1, if the appliance has to be removed from the pendant. Press button 1 and move the arm in the desired direction until it clicks fully into position

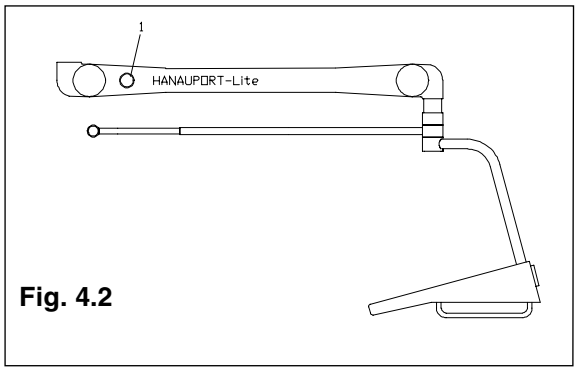


Fig. 4.2

Fig. 4.3

4.2.2. Positioning the lights

The extension arm at position 1 is specially shaped to allow the light to be positioned directly under the central axle, as is required for some disciplines.

In order to achieve best possible mobility please position this arm in relation to the second light in a M position, as shown in fig. 4.2-2. In the M position the spring-arm is always on the inside of the extension arm, never on the outside, so that the light can be easily moved.

ATTENTION! ⚠	Failure to position the arms in the **M** position shown could result in the spring-arms hitting the extension-arms and damage could occur.

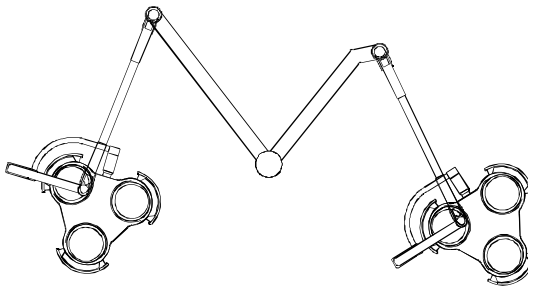


Fig. 4.2.2

To move the lighthead up or down:

Make sure that the sterilisable handle **2** is in position (For details on mounting the handle please see chapter 4.1).

Grip the handle tightly with your hand and gently push or pull the lighthead upwards or downwards into position.

To move the lighthead from side to side:

Firmly grip the outer handles **1** with both hands and gently pull or push the lighthead towards you or away from you.

ATTENTION! ⚠	The lighthead must never be turned upside down while switched on, as the heat generated in the optical system will not be able to radiate downwards and the optical system could be damaged as a result.

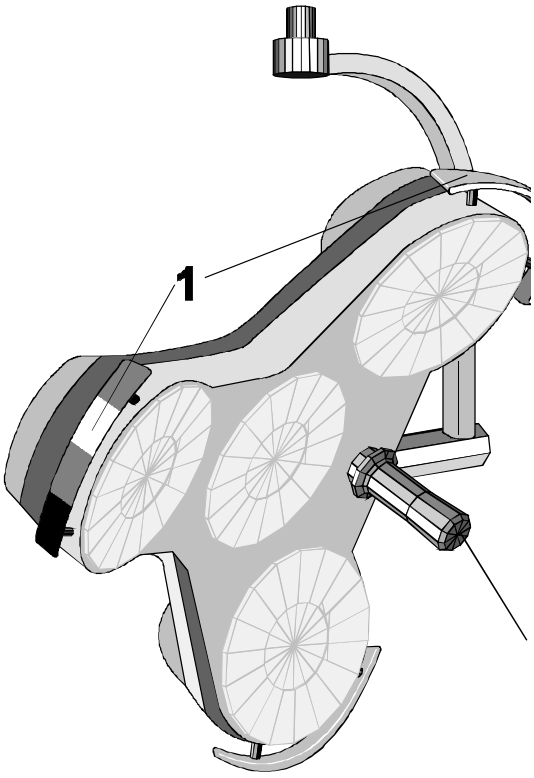


Fig. 4.2.3

4.3 Focussing the lights

4.3.1 Avoiding light spill

When focusing or adjusting the fieldsize of your lights please keep the fieldsize to the minimum. The fieldsize should be just sufficiently large to illuminate the incision and surrounding tissues.

COMMENT!	If the field is too big, light spill around the operating area could dazzle and tire the eyes.

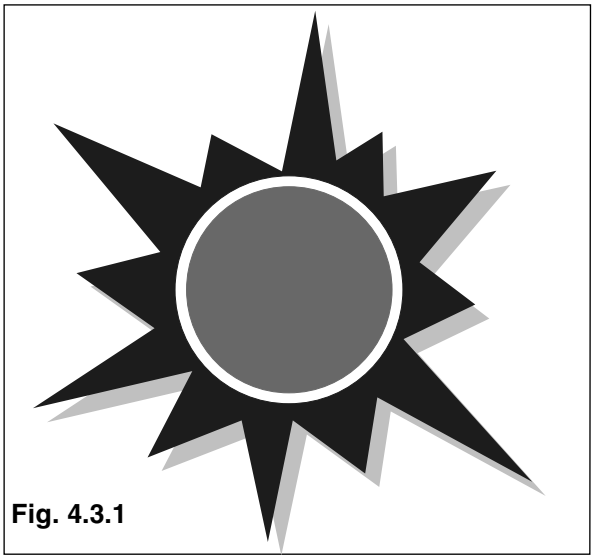


Fig. 4.3.1

4.3.2 Focussing the light

To focus the **2002-2005** models with ERGO-FOCUS, proceed as follows::

1. Make sure the sterilisable handle is correctly mounted.

2. Make sure the light is positioned within 70 to 140 cm of the operating field.

3. Turn the handle **1** until it locks into place. The field remains in this position focused on the operating area.

4. To focus the **2007** model turn the central handle until the field is round and is of the required field size.
   This also applies to the special model 2007 Autofokus. Please consult Section 4.5 for information on how to set the field size of this light at the controls.

To change the fieldsize turn the sterilisable handle **1**:

to the right to increase or
to the left to decrease the fieldsize.

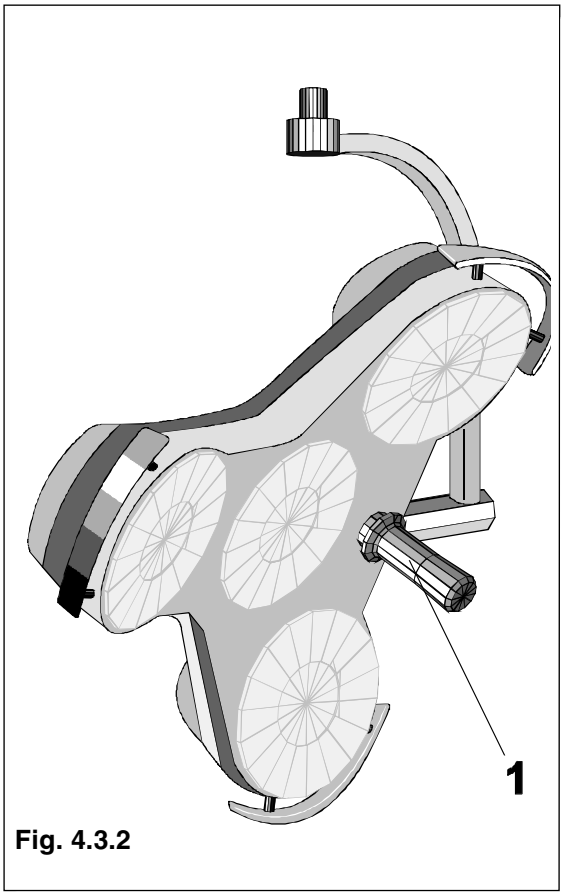


Fig. 4.3.2

4.3.3 Working area and focus range

Your HANAULUX 2000 lights have a special optical system (see chapter 3.1) which has the unique feature of providing a column of light which approximately 50 cm long. In practise this means that once the light is focussed the lighting conditions within an area of 50 cm are more or less uniform. Within this area minimal refocussing is required.

The focus range or operating distance of the lights is 700-1400 mm. This distance is measured from the bottom of the light unit.

COMMENT!	If the light is closer than 70 cm to or further than 140 cm from the operating field the light cannot be properly focussed.

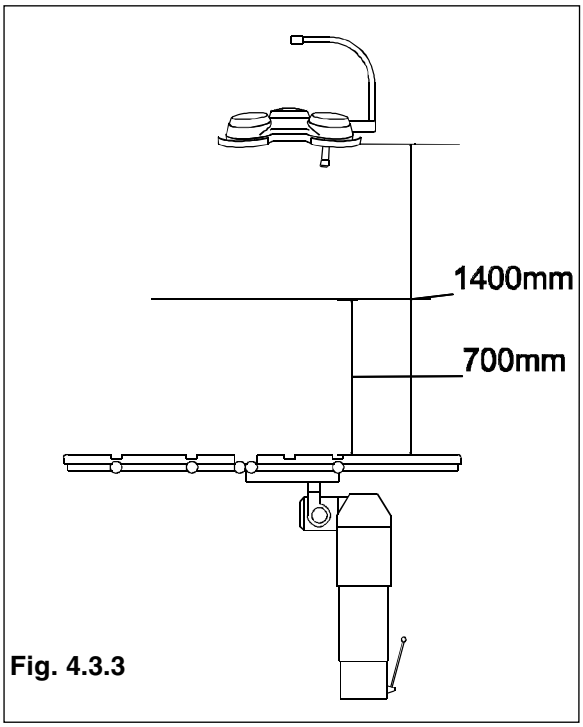


Fig. 4.3.3

4.4 Dimming the light

We recommend the installation of a dimmer for varying the light-intensity. The Heraeus recommended dimmer allows the light-intensity to be varied between 50% and 100% and is mounted in a control panel on the wall. *For further details of the recommended dimmer please see our "Preparatory Measures for Installing HANAULUX 2000."*

Before starting any operation please adjust the illuminance in accordance with the requirements of the intended operation and the surgeon's personal preference.

If the operation is to last more than 2 hours our tip is to begin the operation with a lower light-intensity, e.g. 50 %. This allows you to increase the light-intensity gradually during the operation and to thus compensate the eye fatigue which often occurs during longer operations.

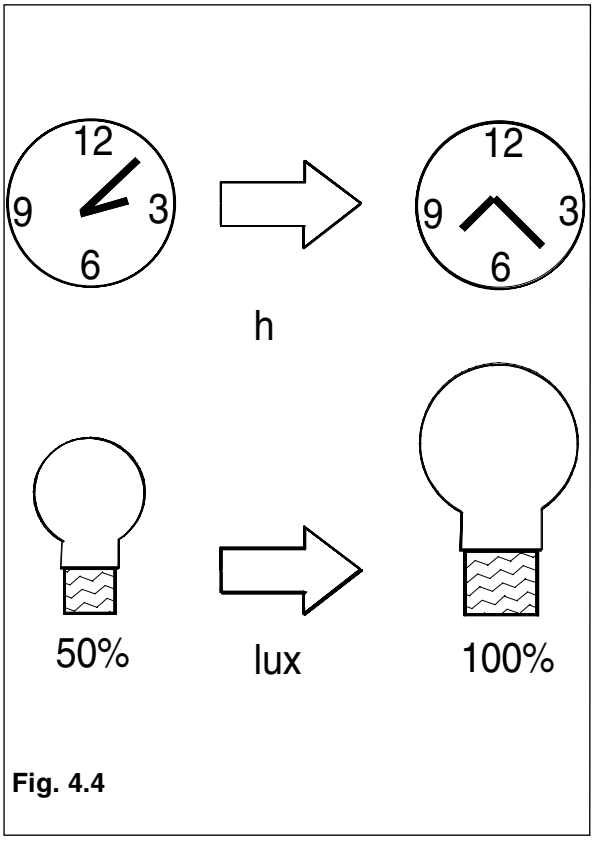


Fig. 4.4

4.5 Operating the 2007 iXl D and 2007 iXL AF

4.5.1 Operating the 2007 iXL AF light

The HANAULUX 2007 iXL AF is equipped with an autofocus system which automatically regulates the fieldsize. In order to optimise the use of your 2007iXL AF light the following must be observed.

- The autofocus system has a working range of 70 to 140 cm, measured from the bottom edge of the lighthead to the operating area.
- The light tests itself when it is turned on. This test lasts about 30 seconds. In order to activate the light after this test a handle must be lightly touched.

The autofocus system is now ready for operation.

The fieldsize can be adjusted at the touchpanel and the middle handle. To change the fieldsize at the touchpanel, the switches "+" or " -" must be pressed. To increase the fieldsize press the switch **1**, to decrease it press the switch **2**. The corresponding light diode lights up.

The autofocus system is now set. The fieldsize will remain the same during the entire operation.

The autofocus only reacts when the distance between the light and the operating field increases. The system will not react if hands or tools are in the operating field. If the light is to be refocussed to a higher point before or after the operation a handle must be lightly touched. The autofocus system will now focus on the first object it finds within its working range.

The autofocus system can be turned off by pressing switch **3**. Press switch **4** to turn the system on again.

4.5.2 Operating the dimmer on the 2007 iXL AF and 2007 iXL D

The 2007 iXL AF and 2007 iXL D lights are equipped with a light-intensity regulator on the touch panel. For important information about the proper use of a dimmer please see chapter 4.4 Press switch **5** to reduce the light-intensity, switch **6** to increase.

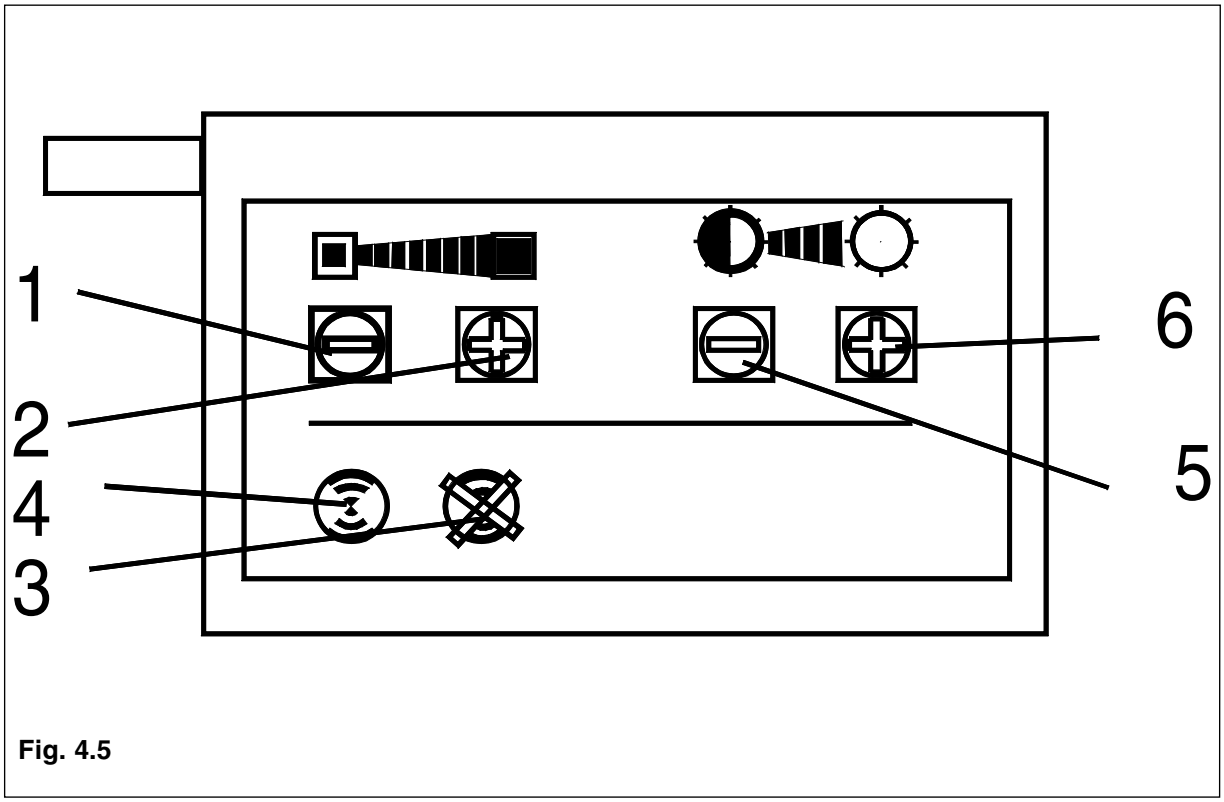


Fig. 4.5

5.0 Important information about halogen bulbs

5.1 Changing a bulb

The shape and structure of the filament of the halogen bulbs used for the HANAULUX 2000 DUO lighting systems are specially designed for the HANAUCHROME optical system (see chapter 3.1).
Only original Hereaus bulbs should be used as any of the following could otherwise occur:

- A lower light-intensity
- A higher temperature increase in the operating field
- Colour falsifications
- Inhomogenous lightfield
- Reduced bulb life
- Damage to the optical system.

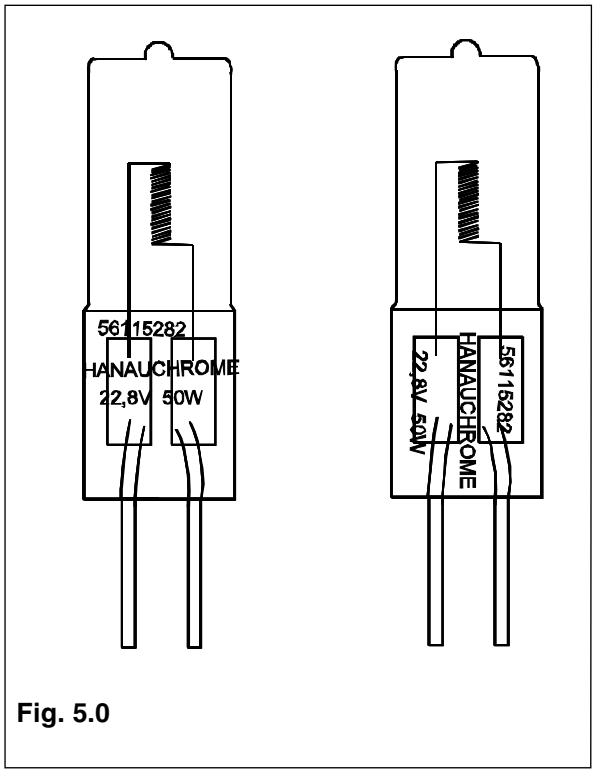


Fig. 5.0

COMMENT!	The halogen bulbs significantly determine the technical data for the HANAULUX operating theatre lights. They are, therefore, accessories under the terms of the law on medical products (§ 3 MPG) and must therefore only be brought into circulation with the CE symbol as this type of accessory.

ATTENTION!	In order to optimise the life and performance of the optical system the voltage to the bulb should not exceed more than 10 % above the rated value of 22,8 V. Excessive voltages could result in damage to the optical system.

Important information about voltage, light-intensity and life of bulb and optical system

The HANAUCHROME bulbs and optical system are rated for a voltage of 22,8 V (AC or DC) at the bulb socket. Higher voltages should be avoided as they cause a decreased bulb life. In extreme cases the life of the optical system could be also be reduced.

A lower voltage results in a lower light-intensity. Significantly lower voltages can also reduce the life of the halogen bulb.

Voltage at flange (V)	Voltage at bulb (V)	Rel. light intensity (%)	Rel. life of bulb (%)
23.0	21.8	90	120
23.5	22.3	96	105
24.0	22.8	100	100
24.5	23.3	105	95
25.0	23.8	109	85
25.5	24.3	70	50

Table showing the relationship between voltage, light-intensity and the life of the bulb.

DANGER!	The bulb generates considerable heat which is emitted through the top of the lighthead. The covers will therefore be quite warm to the touch. Never change a bulb as long as the cover is still warm as you could burn yourself.

Switch off the light system.

1. With one hand push the button **2** in as far as possible. At the same time turn the cover **1** towards the right or the left until it opens.

2. Remove the cover **1** and place carefully to one side. The cover will not fall out as it is attached to the lighthead by a grounding cable.

3. Open the two clips **3** on the socket **4.**

4. Gently pull the socket **4** as far as possible out of the socket holder.

5. Remove bulb **5** from socket **4**.

6. Carefully unpack the new bulb by tearing the bottom of the plastic bubble packaging and pushing the bulb down until the pins protrude about 1.5 cm out of the packaging.

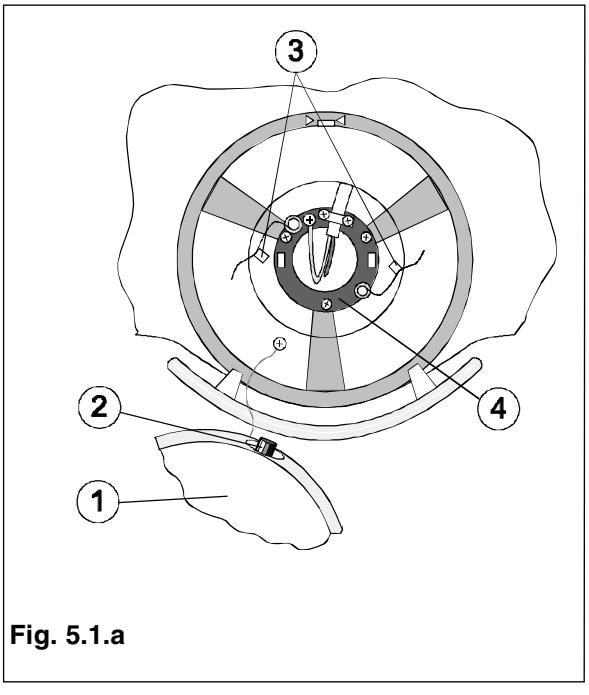


Fig. 5.1.a

COMMENT!	Never touch a bulb with bare hands as the life of the bulb could be considerably shortened.

7. Still holding the bulb **5** in the plastic packaging, gently push the bulb as deeply as possible into the socket **4**. Make sure the bulb is sitting straight. Gently remove the plastic packaging from the bulb.

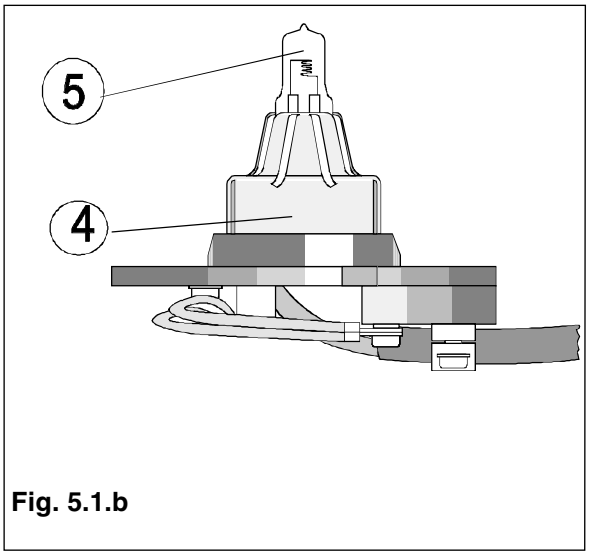


Fig. 5.1.b

8. Replace the socket **4** in the socket holder, taking care not to knock the bulb in the process.The holes on the socket **4** must be matched up to the corresponding fittings on the socket holder. Close the two spring clips **3**.

9. Closing the lighthead cover: Place the cover **1** on the light, making sure that the spring latch **2** is lined up to one of the arrows. Gently press down on the cover **1** and at the same time slowly turn the cover in the direction indicated by the arrow until the cover snaps audibly into place.

6.0 Adjustments

The brakes are always adjusted during the commissioning phase and before official handover. The brakes should always be adjusted so that the manoeuvrability of the light is as light as possible but the light still maintain it's position.

As with all mechanical parts it is to be expected the brakes and the spring balance will fatigue or wear and need readjusting.

Should the brakes be worn they will be too soft and the light could drift from side to side. Should the brakes be too hard the light will be difficult to move. In either case the brakes can be easily readjusted.

Single Lights: Single lights, ceiling and wall version, do not have a brake screw at position 1. The 2003 i and 2004 i/iXL single lights have brake screws at Points **2, 3** and **4**, the 2002 i single light only has them at Points **3** and **4**.

6.1 Adjusting the brakes

Tools:
A flatheaded screwdriver, ca. 6mm is required. The brake adjustment points are shown in fig. 6.1.

All brake screws are slotted screws.
To set the brake force, gently tighten or loosen the brake screw.

ATTENTION!	All other screws are fixing screws and should not be adjusted as a part could loosen and fall down.

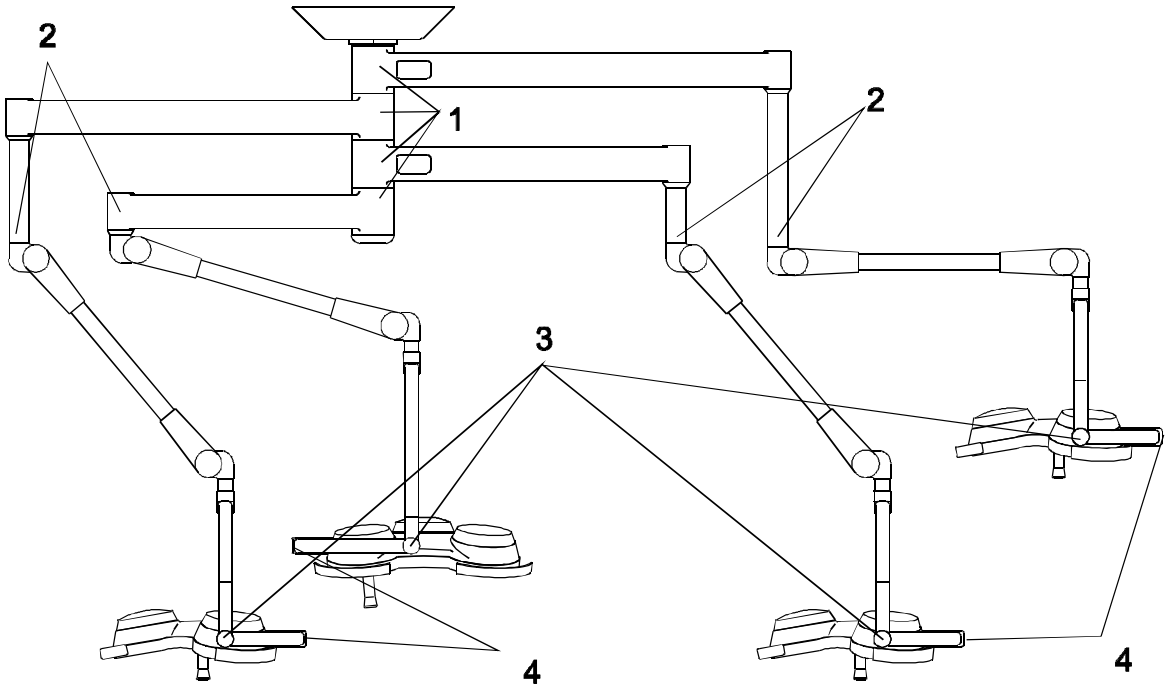


Fig. 6.1

6.2 Adjusting the spring-arms

Should the lighthead drift downwards or jump upwards then the spring balance in the spring-arm is fatigued and must be readjusted. The adjustment method varies with the spring-arm version.

6.2 .1 Adjusting the spring-arms 2002 i -2005 i/iXL

1. Open the spring-arm covers **1** by removing the screw **2**.
2. Use a small screwdriver to gently force the covers apart.
3. Push the spring-arm upwards until the adjustment nut is visible in the opening **1** of the spring-arm. (Fig. 6.2.b)
4. Insert the metal pin which is supplied with the arm into the nut and turn nut to adjust spring force.

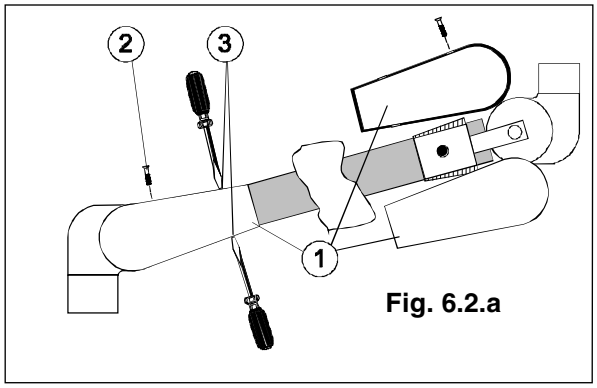


Fig. 6.2.a

Adjust the spring force, so that:

(i) The strength required to pull the spring-arm up or down is the same in both directions,
(ii) The lightheads remain stable and firm in both direction

Turning the nut ⇑	decrease the spring force
Turning the nut ⇓	increases the spring force

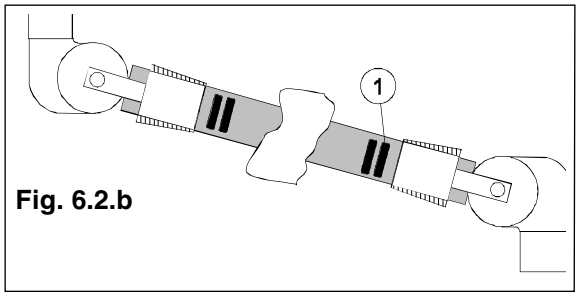


Fig. 6.2.b

5. Place the spring-arm covers on the pring-arm. The holes for the screw **3** and the hole in the cover nose must line up. Make sure that the metal strips **2** are not bent or twisted.
6. Tighten screw **3** to fix covers into place. Check that covers are sitting properly.

ATTENTION! ⚠	The covers must always be screwed into place. Otherwise they could open and fall off during operation.

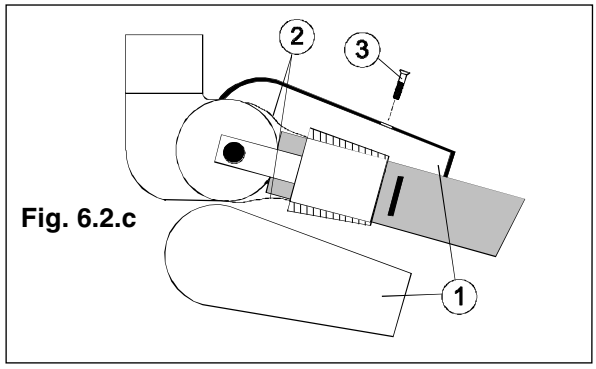


Fig. 6.2.c

6.2.2 Straight spring-arm:

Remove the fixing screw **1** and the cover **2.** Push the spring-arm upwards until the adjustment nut is visible in the opening 3 of the spring-arm. Adjust spring-arm as described in steps 3 and 4.

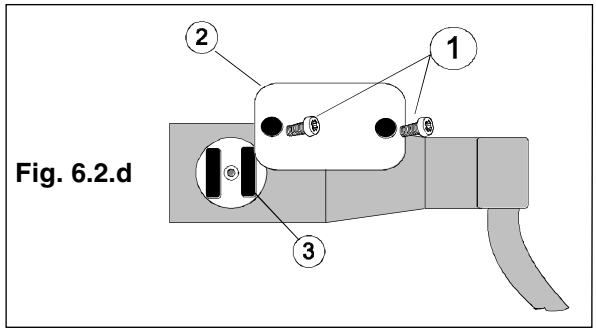


Fig. 6.2.d

6.3 Adjustment of Acrobat 2000 spring arm

6.3.1 Adjustment of spring arm: upper stop

Use the 5 mm Allen key provided (Fig. 1).

Unscrew to raise stop

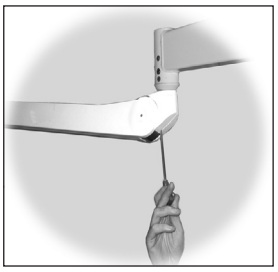
Screw to lower stop (to horizontal)

Abb. / Fig. 1

COMMENT!	
	Reinstall the arm to check the new position obtained. Adjust if required.

6.3.2 Adjustment of spring arm: balancing

Raise the arm above the horizontal to facilitate adjustment (Fig. 2).



Unscrew to increase the strength of the spring arm (cupola goes up)

Screw to reduce the strength of the spring arm (cupola goes down)

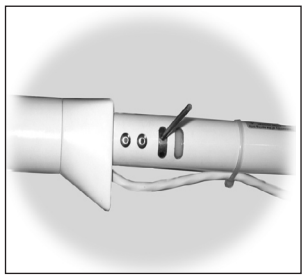
Abb. / Fig. 2

COMMENT!	
	Make sure that the cupola appears to weigh the same during raising and lowering and that it remains stable in any position in which it is left.

6.4 Adjustment of Acrobat 2000 straight spring arm

6.4.1 Adjustment of spring arm: upper stop

Locate the setting. Use the rod provided (Fig. 3)



Turn downwards to lower stop (to horizontal)

Turn upwards to raise stop

Abb. / Fig. 3

Reinstall the side covers, engaging the end first (Fig. 4).

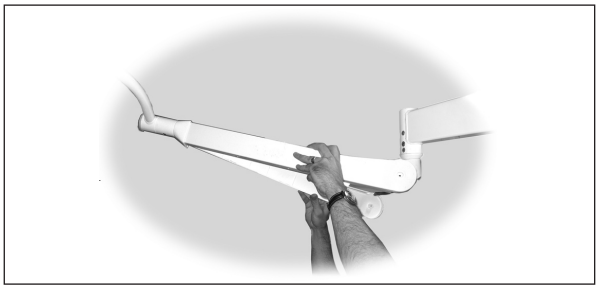


Abb. / Fig. 4

Then engage the other end taking care to leave the spring blades on the outside.

Fasten the covers using a 2.5 mm Allen key (Fig. 5).

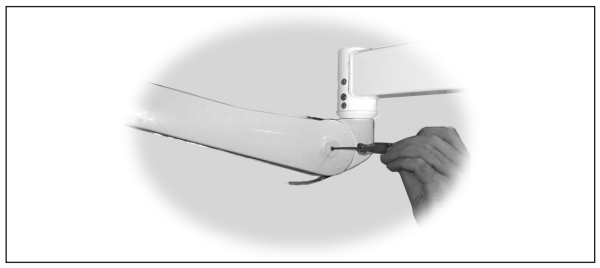


Abb. / Fig. 5

Lower the arm to reinstall the top spring blade. Then raise the arm to reinstall the bottom blade.

6.4.2 Adjustment of spring arm: balancing

See 6.3.2 Adjustment of spring arm: balancing

7.0 Cleaning/desinfecting and sterilising

7.1 Cleaning/ desinfecting the light

The HANAULUX 2000 system has a special powder coat paint coating which is easy to clean and resistant to chemicals. The outer handles are chrome plated to make them chemically resistant.

COMMENT!	Note The user has to pay attention to the demands of the national committee for hygiene and disinfection.

ATTENTION!	To avoid damage to plastic and glass parts, do not use any scouring agent, or any cleaning agent which is alkaline acidic or contains alcohol (e. g. ethanol propanal, ...) or aldehyde. • Only disinfect the apparatus when it is cold. •We recommend our tested cleaning/desinfection agent HANAU -clean. •Because there are a great number of cleaning/desinfecting agents on the market, and we do not know their interactions with plastic used, damage cannot be ruled out if other agents are used. •For cleaning, use a soft, lint-free cloth.

7.2 Cleaning the lenses

The HANAULUX 2000 lenses are made of tough, high quality acrylic. As all plastics are subject to aging processes the lenses should be visually inspected from time to time. Alcohol based cleaning agents should not be used. We recommend the cleaning agent HANAUCLEAN.

ATTENTION!	Lenses which are damaged, cracked or cloudy shoudl be immediately replaced as they could otherwise break during an operation.

ATTENTION!	Sterilising or cleaning agents which contain alcohol should never be used on the HANAULUX 2000 lenses. Alcohol attacts the lenses causing them to become cloudy or milky and the light-intensity will therefore decrease.

7.3 Sterilising the handles

The central handles, both metal and plastic, can withstand up to 350 sterilisation cycles without damage, provided they are correctly sterilised.

The handles should be sterilised as follows:

The handle should be placed upright in the sterilisation unit with the opening facing downwards to prevent any condensation occuring in the cavity. Otherwise the handles could crack.

The sterilisation temperature should not exceed 134°C. The handles should not come into contact with any other appliances during the sterilisation process.

ATTENTION!	Handles which show signs of wear (discolouration, cracking, etc.) should be replaced immediately. A damaged handle could fall off into the sterile area during an operation.

7.4 Cleaning HANAUVISION

For details regarding the special care and cleanig of your HANAUVISION camera system please refer to the separate HANAUVISION operating Instructions.

8.0 Maintenance and repair

HANAULUX operating theatre lights have been designed and built to last for a very long time. However, to guarantee perfect and safe operation over long periods, it is necessary to check the lights regularly. Regional regulations must also be observed when doing this.

8.1 Inspection by the operator

All HANAULUX 2000 products are to be inspected by the operator every six months with attention to the following points:
- defects in paint work
- cracks in plastic parts
- deformation in the supporting system

In the case of any problems or damage, please inform our customer services.

8.2 Inspection by the Service

DANGER!	All HANAULUX 2000 products are serviced once a year by HERAEUS Med or an authorised customer services office. This service covers the following points:

- performance check test
- electrical safety test
- inspection of the supporting system

The service man is trained in how to conduct the tests.

8.3 Important information about

Description	Part. No.
HANAUCHROME bulb, 1off	56 115 282
HANAUCHROME bulbs, 8 off	56 051 757
Sterilisable handle, plastic 3 off	560 50 756
Sterilisable handle, metal 3 off	56 050 755
HANAUCLEAN	56 051778

The HANAULUX 2000 offers two different light systems:
- HANAULUX Improved (i)
- HANAULUX Improved Extra Large (iXL)

When ordering spare parts please observe the following:

Identifying the correct parts:
Please check the model type on the type label which is to be found on lighthead axle.

Model	Reflector (Part. no.)	Lenses (Part. no.)
2006/7 **iXL** 2007 iXL AF	56052959 56052969	56050730 56050732
2004/2005 **iXL**	56052961	56052962
2002 **i** to 2005 **i**	56052961	56052609

Visible markings:
In order to facilitate identification of the correct parts the reflectors and lenses are marked as follows:

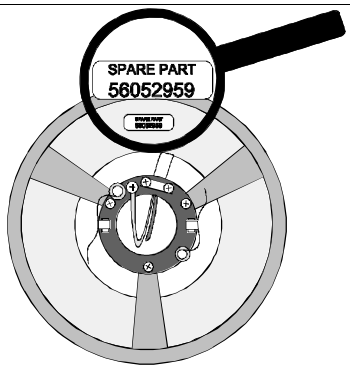


Fig.1: **Reflectors**
Marking: Label with part number

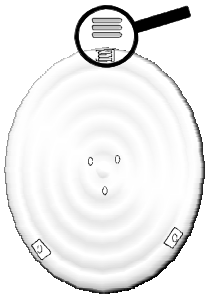


Fig. 2: **Lenses**
2 strips for 2002-5 i, 3 strips for 2004/5 iXL

ATTENTION!	Reflectors and lenses may only be used in the combinations shwon above. Other combinations could result in poor light quality.

9.0 Troubleshooting your HANAULUX 2000 system

Fault	Possible cause	Corrective measure	Reference
Suspension System/Manoeuvrability			
Light is heavy, difficult to move	Brakes are too tight	Readjust brakes	Chapter 6.1
Light is too light, drifts easily	Brakes are too loose or worn	Readjust brakes or replace	Chapter 6.1
Lighthead drifts downwards	Spring-balance in spring-arm is tired, worn	Readjust spring-balance	Chapter 6.2
Lighthead jumps upwards	Spring-balance is too tight	Readjust spring-balance	Chapter 6.2
Spring-arm knocks against ceiling	Spring-arm upper movement must be restricted	Height restrictor must be adjusted. I	Contact service agent
Spring arm covers fall off	Covers have been knocked/damaged	Replace covers. Check that arms are correctly used	Chapter 4.2.2
Metal strips under spring-arm covers broken	- Arm has been knocked/damaged - Covers have been incorrectly mounted	Replace arm Check covers are correctly mounted	Contact service agent Chapter 6.2
Extension-arms move together, scrape against one another	Arm has been knocked too hard and tilted	Light must be checked immediately	Contact service agent
Optical system/Lighting parameters			
Light flickers/ power fails when light is moved	Electrical contact is damaged	Contact must be replaced	Contact service agent
Light-intensity is too low	- Voltage is too low - Wrong bulb(s) in light - Lenses damaged from wrong cleaning agent - Wrong lens!	- Electrician must check - Check bulb, replace - Lenses must be replaced, cleaning must be changed - Check lens version	- Chapter 11 - Chapter 5.0 - Chapter 8.0 - Chapter 9.0
Light not white/ colour wrong	- Wrong bulb(s) - Wrong lens	Replace bulb Check lens version	- Chapter 5.0 - Chapter 9.0
Light too bright	- Wrong bulb(s) - Voltage too high	- Check bulb, replace - Electrician must check	- Chapter 5.0 - Chapter 11.0
Lightfield not round	- Wrong bulbs - optical system damaged	- Check bulb, replace - Optical system must be replaced	Chapter 11.0
Life of bulb too short	- Wrong bulb(s) - Voltage too high	- Check bulb, replace - Electrician must check	Chapter 5.0
Bulbs explode	- Voltage too high - Short circuit in wiring	Electrician must check	

Fault	Possible Cause	Corrective Measure	Reference
Lenses			
Lenses cracked, splitting	Wong cleaning agent used	- Replace lenses - Check cleaning agent	Chapter 8.0
Lenses have melted, bubbled on inside	- Voltage too high - Wrong bulbs used	- Replace lenses - Check voltage - check bulbs	Chapter 5.0
Sterilisable Handles			
Sterilisable Handles do not last long enough (less than 150 cycles)	Handles incorrectly sterilised	Check sterilisation process	Chapter 8.0
Handles are cracked or discoloured	Handles have reached end of working life	Replace immediately	Chapter 8.0
Handles fall off	Handles are damaged/worn	Replace immediately	Chapter 8.0
Focussing/Field change			
Light does not focus when middle handle turned	Focus mechanism broken	Replace immediately	Contact service agent
Focus is stiff/jerky	Focus mechanism dry, must be greased	Grease mechanism	Contact service agent
Light cannot be focussed properly, although focus mechanism works	Light is too close to / too far from operating field	Check that light is within working area	Chapter 4.3

If any of these faults reoccur or cannot be rectified, please contact your service agent.

10.0 Technical data: Lighting parameters

The lighting parameters are measured in accordance with EN 60601-2-41.

Model	Light-intensity (kLux)	Lightfield (cm)	Working area (cm)	Focussable area (cm)
2007 iXL	130	20-35	60	70-140
2007 iXLAF	130	20-35	60	70-140
2006 iXL TV	115	20-35	60	70-140
2005 i	130	17-25	55	70-140
2005 î TV	130	17-25	55	70-140
2005 i NRH	130	17-25	55	70-140
2005 iXL	100	20-30	55	70-140
2005 iXL TV	100	20-30	55	70-140
2005 iXL NRH	100	20-30	55	70-140
2004 i	100	17-25	50	70-140
2004 iXL	80	20-26	50	70-140
2004 i TV	100	17-25	50	70-140
2003 i	80	17-23	50	70-140
2002 i	60	17-23	40	70-140

10.1 Technical data: Mechanical data

Model	max. diameter of rotation (cm)	Vertical action (cm)	Mass of lighthead * (kg)	Mass of suspension system (main light) (kg)	Mass of Sat. suspension system (kg)
2007 iXL	360	100	29	62	-----
2007 iXL AF	360	100	34	62	-----
2005 i	420	115	17	55	28
2005 i TV	420	115	20	55	28
2005 i NRH	420	115	15	55	28
2005 iXL	420	115	17	55	28
2005 iXL TV	420	115	20	55	28
2005 iXLNRH	420	115	15	55	28
2004 i	420	115	16,5	52	18
2004 iXL	420	115	16,5	52	18
2004 i TV	420	115	19	55	28
2003 i	420	115	13,5	52	18
2002 i	420	115	8,5	52	18

* All basis version except 2004/5 i/iXL TV which is always comfort version.

Mass of ceiling anchor ring with shortest flange tube: ca. 20 kg.
For longer flange tubes an extra 1,1 kg must be added for every 10 cm length.

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